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J R C T E C H N I C A L R E P O R T S

How to develop a Sustainable Energy Action Plan (SEAP) in the Eastern Partnership and Central Asian Cities



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ABSTRACT

Since 2010 the Covenant of Mayors (CoM) initiative has come to involve 11 Eastern Partnership and Central Asian countries in the implementation of local sustainable energy policies. The specific situation which characterises these countries compels to adapt the methodology for the preparation of the Sustainable Energy Action Plans which has been developed to address the European context and which has been widely described in the Guidebook "How to develop a Sustainable Energy Action Plan (SEAP)".

The present outline aims to complement the above mentioned Guidebook by presenting the main adaptations to the methodology as they are proposed for Eastern Partnership and Central Asian cities.

It does this by presenting first an overview of the key principles these signatories should keep in mind when preparing a SEAP, and secondly by indicating the main critical aspects of the methodological adaptation. In this framework Eastern Partnership and Central Asian signatories are given the possibility to commit to an emission reduction target by 2020 based on their projections of emissions for this year following a Business-As-Usual scenario.

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1. Introduction

The Covenant of Mayors (CoM) is a major European initiative involving local authorities in the field of sustainable energy development and climate mitigation. By adhering to this initiative, towns, cities and regions voluntarily commit to reducing their overall CO₂ emissions by at least 20% below reference levels by 2020 through the implementation of the measures described in their Sustainable Energy Action Plans (SEAPs). The political commitment undertaken by all the Covenant signatories is declared in the Covenant of Mayors core text,¹ which has to be approved by the municipal council (or equivalent decision making body) at the stage of adhesion to the initiative.

The Covenant of Mayors should be regarded by Local Authorities as a way to contribute to global sustainable development and climate change mitigation policies. Achieving the ambitious Covenant goals requires applying a systematic approach towards reducing the energy consumption of local communities, and increasing the usage of renewable energy sources at local level. In other words, it involves developing local sustainable energy policies and plans, and setting up city-wide energy management systems.

This initiative is spreading beyond European borders and now includes 11 Eastern Partnership and Central Asian countries, namely:

- Armenia
- Azerbaijan
- Belarus
- Georgia
- Kazakhstan
- Kyrgyzstan
- Moldova
- Tajikistan,
- Turkmenistan
- Ukraine
- Uzbekistan.

The methodology for SEAP preparation has been widely described in the Guidebook "How to develop a Sustainable Energy Action Plan (SEAP)"² (referred to in the following as "the SEAP Guidebook") which addresses mainly the European context and aims at helping CoM signatories to obtain the commitments they have taken by signing the Covenant.

The present outline aims to complement the above mentioned SEAP Guidebook by presenting the main adaptations to the methodology as they are proposed for Eastern Partnership and Central Asian cities.

Firstly, an overview of the key principles an Eastern Partnership and Central Asian signatory should keep in mind when preparing a SEAP is given. Subsequently the main critical aspects of the methodological adaptation are briefly presented.

Several references to various parts of the SEAP Guidebook are indicated throughout the document. The aim is to help the reader to use the above mentioned guidelines in an efficient manner. A full-

¹ http://www.eumayors.eu/IMG/pdf/covenantofmayors_text_en.pdf

² http://www.eumayors.eu/IMG/pdf/seap_guidelines_en-2.pdf

fledged version of the Guidebook "How to develop a SEAP in the Eastern Partnership and Central Asian countries" will be published in English and Russian by the end of 2012.

2. The Sustainable Energy Action Plan – The ten key principles to keep in mind when preparing a SEAP

The Sustainable Energy Action Plan (SEAP) is a key document that shows how the Covenant signatory will reach its commitment by 2020. It uses the results of the Baseline Emission Inventory to identify the best fields of action and opportunities for reaching the local authority's CO₂ reductions target. It defines a long-term strategy to accomplish this goal and concrete measures which translate this vision into action.

A summary of the methodological approach to be followed when preparing a Sustainable Energy Action Plan can be identified in the essential principles indicated below. These principles are linked to the commitments taken by the Covenant signatories and have been firstly described in the SEAP Guidebook (*Part I, section 1.10*).

In the following section, the description of each principle is recalled in chronological order and in some cases adapted to the specific situation of Eastern Partnership and Central Asian cities.

2.1 Adaptation of city structures

It is key to the success of the whole process beginning with the design of a SEAP and resulting in its implementation, that a narrow collaboration amongst the different local administrative departments is established and that the SEAP process is taken into account when relevant administrative decisions are made. A SEAP should not be regarded as a standalone document. On the contrary, it should be interlinked with the signatory's energy policy and should be integrated into the everyday life of the different departments of the local administration.

Therefore, the SEAP document itself should indicate which working groups are in place or will be organised for preparing the Baseline Emission Inventory, planning the SEAP actions, implementing them and monitoring the results. Particular reference should be made to the management structure steered by a skilled energy manager and to the allocation of adequate human resources (see also section 5 of the present document and the *SEAP Guidebook, Part I, Chapter 3*).

2.2 Mobilisation of the civil society

To implement and achieve the objectives of the SEAP, the adhesion and participation of the civil society is essential. This is the reason why the mobilisation of the civil society is part of the CoM commitments. It is highly recommended that the local authority includes in its communication strategy arguments that can be particularly appealing to citizens/stakeholders and that it highlights which benefits an effective SEAP implementation can bring (e.g. lower energy bills, better living conditions etc. See also section 5 of the present document). This is because a SEAP is not a plan for the municipality (or the local administrative body) itself but for the whole local community. It should serve as a long term platform for coordinating the major stakeholders, especially in the energy field. The identification of such stakeholders and their involvement in the development of both local energy policy and of the SEAP itself are key preconditions for the plan's successful implementation.

As a result, the SEAP document should describe how the civil society has been involved in the elaboration of the plan, and how it will be involved in its implementation and follow up (see *SEAP Guidebook, Part I, Chapter 4*).

2.3 CO₂ Baseline Emission Inventory (BEI)

The SEAP should be elaborated on the basis of a sound knowledge of the local situation in terms of energy consumption and greenhouse gas emissions. Therefore, an assessment of the current framework should be carried out. This assessment begins with the establishment of a CO₂ Baseline Emission Inventory (BEI), which is one of the key CoM commitments. The BEI has to be included in the full SEAP document officially approved by the local authority.

The BEI and the subsequent inventories (where available) are essential instruments that allow the local authority to have a clear vision on the priorities for action, to evaluate the impact of the measures and determine the progress towards the objective.

Some important characteristics of a BEI are here described:

- The BEI has to be relevant to the local situation, i.e. based on energy consumption/production data, mobility data etc. Estimates based on national/regional averages would not be appropriate in most cases, as they are unlikely to be representative of the specific territorial circumstances and will not represent a relevant starting point for measuring the efforts made by the local authority to reach its CO₂ targets.
- The methodology and data sources should be consistent throughout the years, i.e. the same methodology used to prepare the BEI should be adopted to elaborate the subsequent inventories.
- The BEI must cover at least the sectors in which the local authority intends to take action to meet the emission reduction target, i.e. all sectors that represent significant CO₂ emission sources (see section 4 of the present document).
- The BEI should be accurate, or at least represent a reasonable vision of the reality.
- The data collection process, the data sources and the methodology for calculating the BEI should be well documented (if not in the SEAP then at least in the local authority's records).
- In the case of Eastern Partnership and Central Asian signatories it is highly recommended to include the monitoring of energy expenditure both in the BEI and in the subsequent inventories (see also section 5 of the present document).

(see the *SEAP Guidebook, Part I, Chapter 5* and Part II for more guidelines on the preparation of an Emission Inventory).

2.4 Commitment to a reduction of CO₂ emissions by at least 20% by 2020

The SEAP must contain a clear reference to the signatory's own core commitment for a reduction of CO₂ emissions by 2020. This commitment needs to be at least 20% and based on reference levels, which are defined on the basis of a Baseline Emission Inventory.

Eastern signatories will have three options to set their emissions reduction objective:

- As an absolute reduction;
- As a *per capita* reduction;
- On the basis of a Business as Usual (BAU) scenario, i.e. as an absolute reduction compared to forecast CO₂ emissions in 2020 (see section 3 of the present document).

Contrary to the recommendation indicated in the SEAP Guidebook for the European countries, in the case of the Eastern Partnership and Central Asian signatories the use of a recent baseline year is

highly recommended. The main reason is that local authorities often have difficulties in retrieving reliable data to compile an inventory for 1990.

An additional reason for avoiding choosing such year as the baseline might appear for signatories who want to include industries in their SEAPs, as most of the post-Soviet countries have experienced an economic downturn in the nineties. Hence, those industrialization levels cannot be related to the current ones.

Some local authorities considering amongst other factors the proximity of the year 2020, might have a longer term CO₂ reduction target (for example by 2030). In this case they should set an intermediary objective by 2020 for the reasons of comparability.

2.5 Strategies and actions until 2020

The plan must contain a clear outline of the strategic actions that the local authority intends to take in order to reach its commitments for 2020. It has to describe:

- A long-term strategy and goals with a minimum timeframe reaching 2020 (see the *SEAP Guidebook, Part I, Chapter 6*);
- Detailed measures for the next 3-5 years which translate the long-term strategy and goals into actions. It is crucial for the success of the SEAP that each measure/action is treated as a project and managed as such. It is therefore highly recommended that for every project some fundamental aspects such as the department or person responsible, the timing (start-end, major milestones), the cost estimation and financing/source, the estimated energy saving/increased renewable energy production and the associated estimated CO₂ reduction are identified.

2.6 Comprehensive measures that cover the key sectors of activity

The overall CO₂ reduction commitment has to be translated into concrete actions and measures together with the CO₂ reduction estimates in tons or tons per capita by 2020. The commitment taken by the signatories concerns the reduction of the CO₂ emissions in their respective territories. Hence the approach is territorial and the SEAP has to contain a coherent set of measures covering the key sectors of activity: not only the buildings and facilities that are managed directly by the local authority, but also the other main sectors of activity of the territory (see section 4 of the present document).

It should also be considered that the measures affecting human behaviour are as important as the measures that change the urban environment (e.g. the improvement of infrastructures' energy efficiency). Therefore, low-cost soft measures aiming at forming new ways of thinking and promoting new habits need to be included in a SEAP and implemented at an early stage.

2.7 Financing

A SEAP's successful implementation requires sufficient financial resources. The SEAP should identify the key financing resources that will be used to finance the actions (see *SEAP Guidebook, Part I, Chapter 9*).³ The first and most realistic funding source to invest in the transformation of local energy infrastructures is likely to be the money that will be saved by the local authority itself, the households and the local enterprises thanks to the implementation of SEAP measures aiming at improving energy efficiency. Direct investment of owners/users of energy inefficient properties in

³ Please note that some of the financing schemes described in this Chapter of the SEAP Guidebook may be relevant only to European signatories. Further guidance, specific to the Eastern Partnership and Central Asian countries will be provided in 2013, in the full-fledged version of the Guidebook "How to develop a SEAP in the Eastern Partnership and Central Asian countries".

the municipal territory could be an asset. Additional forms of funding might become available if the owners of “energy related cost savings” are able to demonstrate their capability to profitably reinvest such savings.

2.8 The SEAP document must be approved by the municipal council or equivalent decision-making body

Strong political support is essential to ensure the success of the whole process beginning with the design of a SEAP, resulting in its implementation and continuing with the monitoring of the results achieved. Therefore, it is essential that the Sustainable Energy Action Plan is approved by the Municipal Council or equivalent decision making body, in accordance with the local administrative procedures (see the *SEAP Guidebook, Part I, Chapter 2*).

2.9 Submission of SEAP document and SEAP template

Covenant signatories commit to submitting their SEAP within the year following adhesion. The submission process is completed when:

- The SEAP document, officially approved by the local authority, has been uploaded onto the Covenant of Mayor's website (via the signatories' restricted area). This should be delivered in the national language.⁴
- The SEAP template available in the signatories' corner of the Covenant of Mayors website, has been duly completed in all its parts, in Russian or in English. This template will summarize the overall strategy, the results of the Baseline Emission Inventory as well as the actions and measures designed to reach the emission reduction objective. It is of paramount importance that the template reflects the content of the politically approved document. A specific instruction document for filling in the template is available in the signatories' restricted area of the Covenant of Mayors website.⁵

2.10 Monitoring and reporting

Regular monitoring using relevant indicators allows to evaluate whether the local authority is achieving its targets, and to adopt corrective measures if necessary. Signatories are therefore committed to submit an ‘Implementation Report’ every second year following the submission of the SEAP.⁶ At least every fourth year after SEAP submission this report has to be complemented by a Monitoring Emission Inventory (MEI). If a signatory chooses to set its objective on the basis of a Business As Usual (BAU) scenario, the soundness of the hypotheses lying behind its definition should be checked at least once before 2020.

Moreover, the SEAP itself should contain a brief outline on how the local authority intends to ensure the follow-up of the actions and monitor the results (see *SEAP Guidebook, Part I, Chapter 11*).

⁴ When available, translations of the SEAP document into English and/or Russian can also be uploaded.

⁵ http://www.eumayors.eu/mycovenant/docs/SEAP_template_instructions.pdf

⁶ Specific guidelines on how to carry out SEAP monitoring for the European signatories are under preparation and will be published at the end of 2012.

3. Establishing a CO₂ emission reduction target

The signatories from the Eastern Partnership and Central Asian countries have three options to set their overall CO₂ emission reduction target. The objective can be set:

- As an absolute reduction, compared the overall emissions accounted for the in the BEI (referring to tons of CO₂ or tons of CO₂ eq);
- As a *per capita* reduction, compared the total per capita emissions accounted for the in the BEI (referring to tons of CO₂ per capita or tons of CO₂ eq per capita);
- On the basis of a BAU scenario, calculated starting from the results of the BEI and foreseeing CO₂ emissions for the territory of the local authority in 2020 (referring to tons of CO₂ or tons of CO₂ eq).

The *per capita* option allows signatories to take into account both a sharp decrease and a sharp increase of population within their territory. In case of a strong decrease of population over the years, the signatory is highly recommended to choose a per capita objective or to take into account the population's decline when defining its Business As Usual scenario.

The use of a BAU is the main novelty envisaged for the eastern signatories of the Covenant of Mayors. It has the aim to allow those municipalities who are launched into a rapid economic growth path, to develop their economies in a sustainable manner. It is therefore foreseen that such signatories will see their GHG emissions increase over the years, but it is expected that they will limit such augmentation as much as possible through the implementation of adequate energy policies and climate protection measures.

When preparing a BAU scenario, eastern signatories have two options:

1. Develop their own approach, whose technical and scientific soundness will be analysed by the JRC;
2. Use the national coefficients enclosed in the next section of this document.

From open source information, several emission projection tools and instruments for energy policy analysis and climate mitigation assessments are available. For example, the city of Tbilisi has developed its BAU scenario using the LEAP tool (Long range Energy Alternatives Planning System).⁷ However, each municipality is free to develop its own approach if human resources, financial and technical capabilities allow for it.

National coefficients for BAU projections, developed at Institute for Environment and Sustainability of the Joint Research Centre can alternatively be used. These were developed using the Emission Database for Global Atmospheric Research (EDGAR) within the CIRCE project.⁸ The POLES method (Prospective Outlook for the Long term Energy Systems)⁹ that considers energy consumption increase due to population and economic growth was also employed. The table of national coefficients is provided in ANNEX 1 of this document for each country.¹⁰ The signatories can select their national coefficient according to the chosen baseline year. The coefficient indicates the relative increase in

⁷For more information "Long range Energy Alternatives Planning System: An Introduction to LEAP"
<http://www.energycommunity.org/documents/LEAPIntro.pdf>

⁸ For more information: U.M. Doering, G. Janssens-Maenhout, J.A. van Aardenne, V. Pagliari (2010), CIRCE report D.3.3.1, Climate Change and Impact Research in the Mediterranean Environment: Scenarios of Future Climate Change IES report 62957.

A. Pozzer, P. Zimmermann, U.M. Doering, J. van Aardenne, H. Tost, F. Dentener, G. Janssens-Maenhout, and J. Lelieveld, Effects of business-as-usual anthropogenic emissions on air quality, Atmos. Chem. Phys. Discuss., 12, 8617-8676, 2012, doi:10.5194/acpd-12-8617-2012

⁹ For more information on POLES model: Russ, P., Wiesenthal, T., van Regenmorter, D., Ciscar, J. C., 2007. Global Climate Policy Scenarios for 2030 and beyond. Analysis of Greenhouse Gas Emission Reduction Pathway Scenarios with the POLES and GEM-E3 models, JRC Reference report EUR 23032 EN.
<http://ipts.jrc.ec.europa.eu/publications/pub.cfm?id=1510>

¹⁰ For more information on the elaboration of these coefficients <http://edgar.jrc.ec.europa.eu/com/index.php>

greenhouse gas emission between the baseline year and the 2020. For example, in case of Georgia, the coefficient is 1,66 when year 2005 is selected as the baseline year. This implies that to obtain GHG emission in the year 2020, the emission in the baseline year (i.e., 2005) has to be multiplied by 1,66.

In other words:

$$Emissions_{co2}^{2020} = Emissions_{co2}^{2005} \cdot 1,66 \quad (1)$$

In general terms:

$$Emissions_{co2}^{2020} = Emissions_{co2}^{Base_line_year} \cdot K \quad (2)$$

Where: K is the coefficient from Table 1 (ANNEX 1), selected according to the chosen baseline year,

$Emissions_{co2}^{Base_line_year}$ are the emissions in the baseline year.

The soundness of the BAU scenario should be monitored by the signatories themselves as well as by the JRC at least once before the year 2020. This is to allow the evaluation of the reliability of the principles on which basis the BAU projections were made. In case this assessment highlights a strong deviation between the BAU predictions and the actual situation, the actions and measures foreseen by the SEAP should be revised and an adjustment of the political target might become advisable.

4. The choice of the key sectors of activity for the preparation of a relevant SEAP

The definition of the emission inventories and the knowledge of the local situation as well as of the future perspectives of the territory are essential for the identification of the priority areas of intervention and the selection of the relevant measures aiming at reducing CO₂ emissions within the territory. Even though the share of emissions per sector is specific to each municipality, the following are normally the highest emitting ones in an urban environment and should therefore be addressed in a SEAP:

- Municipal Buildings, Equipment/Facilities;
- Tertiary Buildings, Equipment/Facilities;
- Residential Buildings;
- Local Transport.

The minimum criteria currently applied for SEAP acceptance is that at least 3 out of 4 key sectors are covered in the BEI and that actions are foreseen at least for the municipal sectors and one of the other key sectors.

Nevertheless, the recommendation is to include all the sectors mentioned above and as many as possible of other relevant sectors of activity, namely:

- District heating plants and waste & water treatment facilities (when present on the territory);
- Public lighting;
- Local Energy Production;
- Land Use Planning;
- Industry (if present on the territory);
- Public procurement of products and services;
- Working with the citizens and the stakeholders.

In particular, addressing district heating¹¹ and waste & water treatment facilities (when on the territory) is considered of paramount importance for eastern signatories as these sectors are often highly emitting and their energy efficiency can be greatly improved.

Many suggestions of policies and measures relevant to the other sectors mentioned above and that can be applied at local level can be found in the SEAP Guidebook (*see Part I, Chapter 8 and Part III*).

5. Building support from the citizens and the stakeholders

Building consensus amongst the citizens and the stakeholders has been recognised to be a necessity if the local authority wants to ensure the success of the whole SEAP process. It is indeed identified to be one of the first steps towards reaching the CO₂ emission reduction target (see section 2 of the present document and the *SEAP Guidebook, Part I, Chapter 1, Paragraph 1.4*).

Signatories from the Eastern Partnership and Central Asian countries are particularly recommended to draft a communication plan focusing on the benefits an effective SEAP implementation can bring to the community in terms of energy service improvement and its efficiency.

The local authorities themselves should lead the way forward by example; therefore they should consider reducing the operational costs for local energy infrastructure a city level and for households. Putting in place an Energy Management System in accordance with international standards (such as ISO 50001¹²) can be an excellent way to do this. An Energy Management System contains a series of processes that enable an organization to use data and information to maintain and improve energy performance, while improving operational efficiencies, decreasing energy intensity, and reducing environmental impacts.

Showing early results achieved by the local authority is another effective way to demonstrate the value of the project and to build stakeholders' support.

Local authorities are advised to aim first at simple energy savings that can be achieved through improved human behaviour. Raising awareness on how to avoid energy waste, for instance, is a simple and cost-effective manner to reduce CO₂ emissions. This type of actions can be considered as 'low hanging fruits' and might easily be implemented and supported by citizens and stakeholders.

¹¹ A relevant document on district heating is "COMING IN FROM THE COLD: Improving District Heating Policy in Transition Economies" <http://www.iea.org/textbase/nppdf/free/archives/cold.pdf>. Published by the International Energy Agency, this report aims to help governments design policy approaches that can effectively address the key challenges facing the district heating sector: more efficient, environmentally friendly district heating. It provides a recommendations on supply and demand policy sequencing, highlights steps to be taken for better regulation or for introducing the competition.

¹² ISO 50001 Energy Management Standard: <http://www1.eere.energy.gov/energymanagement/index.html> The standard addresses the following:

- Energy use and consumption.
- Measurement, documentation, and reporting of energy use and consumption.
- Design and procurement practices for energy-using equipment, systems, and processes.
- Development of an energy management plan and other factors affecting energy performance that can be monitored and influenced by the organization.

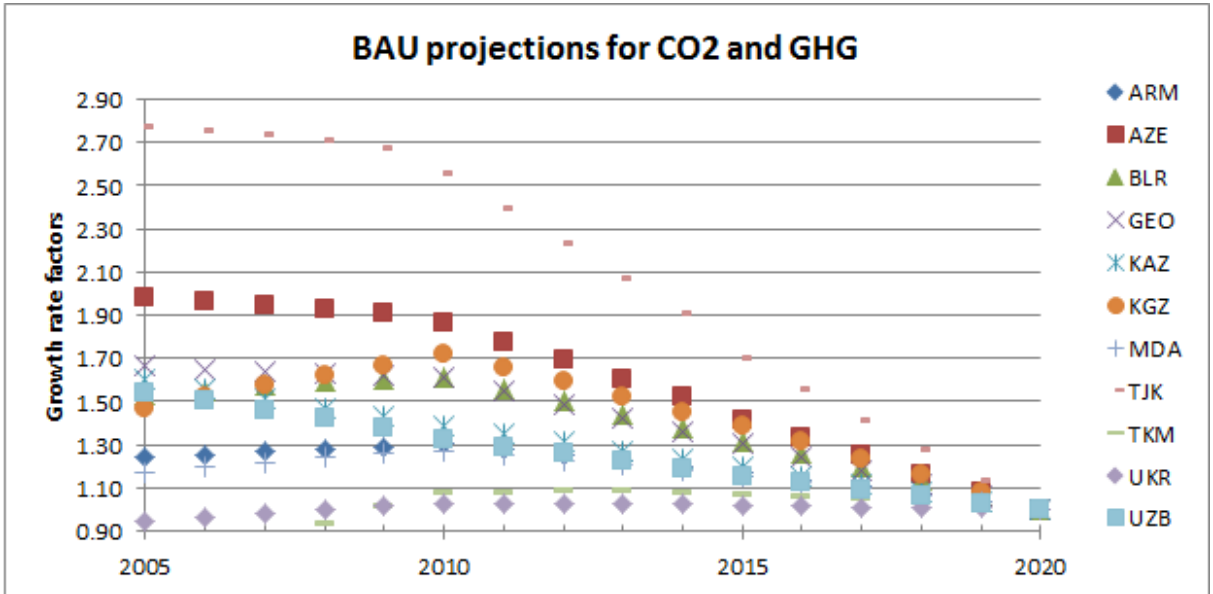
ANNEX 1: National coefficients for BAU projections

Summary of the country-specific coefficients for CoM-East signatories to estimate their CO₂ or GHG emissions in 2020 based on baseline year (2005-2020) estimates.

Table 1

BAU projections	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
ARM	1.24	1.25	1.27	1.28	1.29	1.31	1.28	1.25	1.23	1.20	1.17	1.14	1.11	1.07	1.04	1.00
AZE	1.98	1.96	1.95	1.93	1.91	1.87	1.78	1.69	1.61	1.52	1.42	1.33	1.25	1.17	1.08	1.00
BLR	1.09	1.09	1.10	1.10	1.10	1.10	1.10	1.09	1.08	1.07	1.05	1.04	1.03	1.02	1.01	1.00
GEO	1.66	1.65	1.64	1.63	1.62	1.61	1.55	1.49	1.42	1.36	1.30	1.24	1.18	1.12	1.06	1.00
KAZ	1.11	1.10	1.09	1.09	1.08	1.07	1.06	1.06	1.05	1.04	1.04	1.03	1.02	1.01	1.01	1.00
KGZ	1.47	1.52	1.57	1.62	1.67	1.72	1.66	1.59	1.52	1.45	1.39	1.31	1.24	1.16	1.08	1.00
MDA	1.17	1.20	1.22	1.24	1.26	1.27	1.25	1.23	1.20	1.18	1.15	1.12	1.09	1.06	1.03	1.00
TJK	2.78	2.76	2.73	2.71	2.68	2.56	2.39	2.23	2.07	1.91	1.70	1.56	1.42	1.28	1.14	1.00
TKM	0.98	0.98	0.99	1.00	1.00	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.00	1.00	1.00	1.00
UKR	0.98	0.99	0.99	1.00	1.00	1.01	1.01	1.01	1.01	1.01	1.01	1.01	1.00	1.00	1.00	1.00
UZB	1.54	1.50	1.46	1.42	1.38	1.32	1.29	1.26	1.22	1.19	1.15	1.12	1.09	1.06	1.03	1.00

Figure 1



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Abstract

Since 2010 the Covenant of Mayors (CoM) initiative has come to involve 11 Eastern Partnership and Central Asian countries in the implementation of local sustainable energy policies. The specific situation which characterises these countries compels to adapt the methodology for the preparation of the Sustainable Energy Action Plans which has been developed to address the European context and which has been widely described in the Guidebook "How to develop a Sustainable Energy Action Plan (SEAP)".

The present outline aims to complement the above mentioned Guidebook by presenting the main adaptations to the methodology as they are proposed for Eastern Partnership and Central Asian cities.

It does this by presenting first an overview of the key principles these signatories should keep in mind when preparing a SEAP, and secondly by indicating the main critical aspects of the methodological adaptation. In this framework Eastern Partnership and Central Asian signatories are given the possibility to commit to an emission reduction target by 2020 based on their projections of emissions for this year following a Business-As-Usual scenario.

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